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EXAMINER	
HANNETT, JAMES M	

ART UNIT	PAPER NUMBER
2612	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/659,355	NETER, SARIT	
	Examiner	Art Unit	
	James M Hannett	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 1-11 is/are allowed.

6)☒ Claim(s) 12-34 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 9/12/2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4 and 5.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1: Claims 12, 14, 15, 19, 21 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5,805,216 Tabei et al.

2: In regards to Claim 12, Tabei et al teaches on Column 1, Lines 59-67, Column 2, Lines 51-65 and Column 3, Lines 42-50 Column 4, Lines 20-26 a method of detecting a defective pixel element within an array of pixel elements in an imaging device while the imaging device is in use by an end-user, the method comprises: Capturing an image taken by the end-user using the imaging device; For the captured image, comparing a first pixel element value (center pixel Value) with a second value (absolute value of the level differences between pixels) related to at least element values of other imaging pixel elements in a first group; determining from the comparison if the first pixel element value is in error; and substituting a third value (average of output data of surrounding pixels) related to the value of at least one of the other pixel elements at least partly in response to determining the first pixel element value is error.

3: In regards to Claim 14, Tabei et al teaches on Column 2, Lines 55-60 that the first group includes at least two pixel elements adjacent to the first pixel element. The first group of pixels is viewed by the examiner as the peripheral adjacent pixels that surround a center pixel. The first pixel element is viewed as the center pixel in the 3x3 block of pixels.

4: As for Claim 15, Tabei et al teaches on Column 2, Lines 51-65 that the second value is also related to the first pixel element value. The first and second pixel values are related because they are all formed from data in the same 3x3 pixel block.

5: As for Claim 19, Tabei et al teaches on Column 1, Lines 59-67, Column 2, Lines 51-65 and Column 3, Lines 42-50 Column 4, Lines 20-26 and Figure 5 an imaging system configured to compensate for one or more individual defective pixels in an imaging array (10), the system comprising: A readout controller coupled to the imaging array, the readout controller configured to read a group of pixels within the array Column 4, Lines 5-10; a defective pixel detection circuit configured to determine when at least a first pixel value associated with a first pixel within the group of pixels varies from a second value related to at least one other pixel within the group of pixels by a first amount; a pixel compensation circuit configured to replace the value of the first pixel (center pixel) with a third value (average of the output values of adjacent pixels) related to at least one other pixel within the group of pixels when the first pixel value varies by more than the first amount from the second value.

6: As for Claim 21, Tabei et al teaches on Column 1, Lines 59-67 the second value is an average value of a plurality of pixel values of pixels within the group of pixels.

7: As for Claim 25, Tabei et al teaches on Column 3, Liners 45-46 the array is a CCD array.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8: Claims 26, 30-34 are rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,724,945 Yen et al.

9: In regards to Claim 26, Yen et al teaches on Column 2, Lines 1-7, Column 2, Lines 17-40 and Figure (1 and 4) a camera system, comprising: An imager (20), including a plurality of pixels; a lens (16) overlaying at least a portion of the imager; a readout circuit (30) coupled to the imager, the readout circuit configured to read imager pixel values; A defective pixel detection circuit (26) configured to determine if a first pixel is defective by examining the pixel values of a plurality of pixels readout by the readout circuit; a pixel compensation circuit configured to substitute the value of the first pixel with a value related to at least one other pixel value readout by the readout circuit. It is inherent in the design of Yen et al that it includes a power supply used to power the readout controller, the defective pixel detection circuit, and the pixel compensation circuit.

10: In regards to Claim 30, Yen et al teaches on Column 3, Lines 7-10 a color filter (18) comprising a color filter positioned over at least a portion of the imager (20).

11: As for Claim 31, Yen et al teaches on Column 2, Lines 17-40 a method of detecting a defective pixel element within pixel elements in an imaging device using an image captured by the end-user, the method comprising: For a captured image, comparing a first pixel element value (center pixel value) with a second value related to at least element values of pixels in a two dimensional neighborhood; determining from the comparison if the first pixel element value is in error; and substituting the first pixel element value with a third value related to a value of at least one of the other pixel elements in the two dimensional neighborhood. The third value is viewed as the median pixel value and the second value is viewed as the difference value.

12: In regards to Claim 32, Yen et al teaches on Column 2, Lines 1-7 that the second value is related to at least two element values corresponding to at least two pixels on opposite sides of the first pixel element.

13: As for Claim 33, Yen et al teaches on Column 2, Lines 32-39 the comparison includes determining if the first pixel element value varies from the second value by more than a threshold amount.

14: In regards to Claim 34, Yen et al teaches on Column 2, Lines 1-7, Column 2, Lines 17-40 and Figure (1 and 4) an imaging system comprising: An imager (20) including a plurality of pixel sensor elements Figure 2; a controller (30) coupled to the imager, the controller configured to read pixel sensor element values; a defective pixel detection circuit (26) configured to determine when at least a first pixel value associated with a first pixel sensor element within a two dimensional neighborhood is in error by comparing the at least first pixel value to a second value related to at least one other pixel element within the two dimensional neighborhood; and a pixel compensation circuit configured to replace the value of the first pixel element with a third value related to at least one other pixel element within the two dimensional neighborhood.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15: Claims 18 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,805,216 Tabei et al.

16: In regards to Claim 18, Tabei et al teaches the claimed invention as discussed in Claim 12, However, Tabei et al is silent as to if the CCD image sensor is a color or mono-chrome image sensor.

Official notice is taken that it was well known in the art at the time the invention was made to enable CCD image sensors to be either color or Black and white (monochrome) in order to allow a user to take color or black and white images.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the CCD image sensor of Tabei et al to be monochrome black-and-white image sensor in order to allow a user to capture black and white images.

17: In regards to Claim 24, Tabei et al teaches the claimed invention as discussed in Claim 19, However, Tabei et al teaches that the image sensor is a CCD image sensor and does not teach that the camera can utilize a CMOS image sensor.

Official notice is taken that it was well known in the art at the time the invention was made to use CMOS image sensors in digital cameras because CMOS image sensors offer some characteristics which are superior to CCD image sensors.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a CMOS image sensor for the image sensor of Tabie et al to allow a camera designer to take advantage of superior characteristics of a CMOS image sensor.

18: Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,724,945 Yen et al.

19: As for Claim 27, Yen et al teaches the invention as discussed in Claim 26, Yen et al teaches the use of a digital imaging device but does not teach that the digital imaging device can be a video camera.

Official notice is taken that it was well known in the art at the time the invention was made to enable digital imaging devices to take video images to enable a user to capture motion video.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the digital imaging device of Yen et al to take motion video to enable a user to capture motion video.

20: In regards to Claim 28, Yen et al teaches the invention as discussed in Claim 26, Yen et al teaches the use of a digital imaging device but does not teach that the digital imaging device can be a video camera.

Official notice is taken that it was well known in the art at the time the invention was made to enable digital imaging devices to take video images to enable a user to capture motion video in an NTSC format to view motion video on a conventional NTSC color television..

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the digital imaging device of Yen et al to take motion video to enable a user to capture motion video and view the motion video on an NTSC television.

21: As for Claim 29, Yen et al teaches the invention as discussed in Claim 26, Yen does not teach that the camera is located in a phone.

Official notice is taken that it was well know in the art at the time the invention was made to place digital camera on cell-phones to enable users to take pictures with their phones.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the camera of Yen et al in a phone to enable users to take pictures with their phones.

22: Claims 13, 16, 17, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,805,216 Tabei et al in view of USPN 6,724,945 Yen et al.

23: As for Claim 13, Tabei et al teaches the claimed invention as discussed in Claim 12, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel defects by replacing the data of the defective pixel with the average value of pixels that surround the defective pixel. Tabei et al does not teach comparing the value of the first pixel element with the median value of the first group of pixels.

Yen et al teaches a method for correcting defective pixels in an image sensor. Yen teaches on Column 1, Lines 34-37 and on Column 2, Lines 32-39 that it is advantageous when correcting pixel defects to compare the value of the first pixel element (center pixel) with the median value of the first group of pixels. Yen et al teaches that this method is advantageous because it prevents the image from becoming distorted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to comparing the value of the first pixel element (center pixel) with the median value of the first group of pixels as taught by Yen et al in the camera of Tabei et al in order to prevent the image from becoming distorted.

24: In regards to Claim 16, Tabei et al teaches the claimed invention as discussed in Claim 12, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel defects by replacing the data of the defective pixel with the average value of pixels that surround

the defective pixel. Tabei et al does not teach replacing the center pixel with the median value of at least two other pixel values.

Yen et al teaches a method for correcting defective pixels in an image sensor. Yen teaches on Column 1, Lines 34-37 and on Column 2, Lines 32-39 that it is advantageous when correcting pixel defects to compare the value of the first pixel element (center pixel) with the median value of the first group of pixels and to replace the center pixel with the median value of at least two other pixel values. Yen et al teaches that this method is advantageous because it prevents the image from becoming distorted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to comparing the value of the first pixel element (center pixel) with the median value of the first group of pixels as taught by Yen et al in the camera of Tabei et al in order to prevent the image from becoming distorted.

25: As for Claim 17, Tabei et al teaches the claimed invention as discussed in Claim 12, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel defects by replacing the data of the defective pixel with the average value of pixels that surround the defective pixel. However, Tabei et al does not teach that the imaging device is a color imaging device, and the other pixels whose values are compared to the first pixel value are intended to sense the same color as the first pixel element.

Yen et al teaches on Column 3, Lines 7-10 and Column 2, Lines 17-23 that it is advantageous when designing a digital camera that can correct for pixel defects, to correct pixels with defects based on a value that corresponds to the median value of the surrounding pixels that

are on the same color plane. This is advantageous because it allows the pixels to be corrected with more accurate values based on the corresponding color.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a color image sensor as taught by Yen et al in the camera of Tabei et al and correct the defective pixel with pixel data that has the same color as the defective pixel, in order to improve image quality.

26: In regards to Claim 20, Tabei et al teaches the claimed invention as discussed in Claim 19, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel defects by replacing the data of the defective pixel with the average value of pixels that surround the defective pixel. Tabei et al does not teach comparing the value of the first pixel element with the median value of the first group of pixels.

Yen et al teaches a method for correcting defective pixels in an image sensor. Yen teaches on Column 1, Lines 34-37 and on Column 2, Lines 32-39 that it is advantageous when correcting pixel defects to compare the value of the first pixel element (center pixel) with the median value of the first group of pixels. Yen et al teaches that this method is advantageous because it prevents the image from becoming distorted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to comparing the value of the first pixel element (center pixel) with the median value of the first group of pixels as taught by Yen et al in the camera of Tabei et al in order to prevent the image from becoming distorted.

27: In regards to Claim 22, Tabei et al teaches the claimed invention as discussed in Claim 19, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel

defects by replacing the data of the defective pixel with the average value of pixels that surround the defective pixel. Tabei et al does not teach replacing the center pixel with the median value of at least two other pixel values.

Yen et al teaches a method for correcting defective pixels in an image sensor. Yen teaches on Column 1, Lines 34-37 and on Column 2, Lines 32-39 that it is advantageous when correcting pixel defects to compare the value of the first pixel element (center pixel) with the median value of the first group of pixels and to replace the center pixel with the median value of at least two other pixel values. Yen et al teaches that this method is advantageous because it prevents the image from becoming distorted.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to comparing the value of the first pixel element (center pixel) with the median value of the first group of pixels as taught by Yen et al in the camera of Tabei et al in order to prevent the image from becoming distorted.

28: As for Claim 23, Tabei et al teaches the claimed invention as discussed in Claim 19, Tabei et al teaches the use of a camera that can detect pixel defects and correct the pixel defects by replacing the data of the defective pixel with the average value of pixels that surround the defective pixel. However, Tabei et al does not teach that the imaging device is a color imaging device, and the other pixels whose values are compared to the first pixel value are intended to sense the same color as the first pixel element.

Yen et al teaches on Column 3, Lines 7-10 and Column 2, Lines 17-23 that it is advantageous when designing a digital camera that can correct for pixel defects, to correct pixels with defects based on a value that corresponds to the median value of the surrounding pixels that

are on the same color plane. This is advantageous because it allows the pixels to be corrected with more accurate values based on the corresponding color.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a color image sensor as taught by Yen et al in the camera of Tabei et al and correct the defective pixel with pixel data that has the same color as the defective pixel, in order to improve image quality.

Allowable Subject Matter

29: Claims 1-11 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach or suggest the use of an imaging system configured to compensate for one or more individual defective pixels in an array of pixel elements, wherein a controller is configured to generate pixel addresses of at least three subsets of pixels within a block and a bad pixel detection and correction unit configured to determine the subset with the minimum variance, calculate a median of each subset, determine whether a value of the center pixel exceeds the medians of the subsets, and to replace the value of the center pixel with the median of the subset with the minimum variance if the value of the center pixel exceeds the medians of the subsets.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 5,995,675 Hwang teaches the use of a defect compensator for a solid state image pickup device; USPN 6,683,643 Takayama et al teaches the use of a camera that can correct pixel defects in images; USPN 6,618,084 Rambaldi et al teaches the use of a pixel

correction system for CMOS image sensors; USPN 6,665,009 Dong teaches the use of an on-chip dead pixel correction CMOS image sensor; USPN 5,327,246 Suzuki teaches the use of a camera that can correct pixel defects; USPN 6,642,960 Kohashi et al teaches the use of a camera that is capable of compensating for fault pixels using pixels that surround the pixels Fault in a CCD image sensor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett
Examiner
Art Unit 2612

JMH
April 26, 2004

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